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# **Are States with Larger than Average Black Populations Really the Worst Places to live in the USA?**

## **A Spatial Equilibrium Approach to Ranking Quality of Life**

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*Quality-of-life rankings based on location-specific attributes/local amenities could induce elected official and policy makers into incorrectly constructing economic development plans if the ranking scheme was flawed. Hierarchical rankings of states in the USA in terms of quality-of-life that use an explicit amenity accounting method, typically assign lower ranks to states with large Black American populations. We show that these rankings utilize methodologies that are not based on economic theory, and that they arbitrarily construct ranking schemes about what individuals and firms value about the places where they locate. This pick-and-choose amenities accounting approach has its merits; however, we show that this approach introduces a bias into the ranking process. An alternative theoretically tenable and unbiased approach to measuring quality-of-life in particular locations follows from two important notions. First, a significant amount of what individuals and firms value in the places where they locate is unobservable. Secondly, the value of tangible and intangible location specific attributes (amenities) is captured by the difference between amenity-adjusted, housing prices and incomes. We implement a ranking scheme consistent with this notion, and find that when ranking states in the USA in terms of quality-of-life, states with large Black populations move up in the rankings substantially. Additionally, we find that relative to standard explicit amenity accounting quality-of-life measure, our spatial equilibrium measures can better explain the location choices of individuals, as measured by net migration.*

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Since quality-of-life rankings were introduced in the early 1980s, livable place rankings in the USA of the type that appear in *Places Rated Almanac* (Boyer and Savageau, 1989) and *Morgan Quitno Press* (Morgan and Morgan, 2008), have captured the attention of policy

makers as potential inputs into the economic development and planning process. Even though these popular measures of rating locations lack a firm theoretical grounding and are biased (Douglas and Wall, 1993; Luger 1996), they have become important policy tools used to attract physical and human capital (Deng and Gao, 2013; Rogerson, 1999; Stimson and Marans, 2011). Given that physical and human capital are highly mobile in the long-run, their utilization and employment levels are sensitive to location specific attributes or amenities—which are measured by a variety of quality-of-life indexes. In this context, if quality-of-life rankings are bias, and serve as inputs into the economic development and planning processes, they could lead to decisions that are suboptimal with respect to creating and/or promoting the type of environment believed to be important for attracting highly productive human and physical capital that engenders economic growth.

Typically, quality-of-life rankings employ an arbitrary explicit “amenity” accounting process that generates relative rankings of locations. Morgan Quitno Press (hereafter MQ) ranks the 50 states using this type process. Implicit to this approach is the presumption that researchers can determine a priori, which location specific attributes people value in the places they live. These measures are used extensively in economic research. They have been utilized to examine the extent to which amenities are capitalized into housing prices (Glaeser, Kolko, and Saiz, 2001), rents (Shultz and King, 2001), wages/incomes (Ezzet-Loftstrom, 2004), and whether or not they matter for the location decisions of manufacturing establishments (Granger and Blomquist, 1999).

While studies utilizing these measures produce empirical findings that are consistent with the idea of compensating wage and rent differentials, the quality-of-life measures require a leap of faith to believe that some itemized list of empirically significant amenities can account for central items that individuals value in a particular place. An additional shortcoming of MQ-type quality-of-life rankings is that they presume that across geographic space, amenities are homogeneous and uniformly demanded. This type of homogeneity is rather restrictive, and assumes amenities are equally valued across households. To the extent that this is not true, quality-of-life indexes constructed as such, can suffer from substantial bias. If for example, relative to household A in region 1, household B in region 2 values clean air at a lower rate, an index that provides equal weight for clear air in an amenity index for both regions would result in household B in region 2 having a relatively lower quality-of-life ranking. An unbiased index would assign a weight to clean air based upon how households actually value clean air.

In this paper, we consider Morgan Quitno Press’ quality-of-life state rankings, and argue that these types of rankings are based on a methodology that is arbitrary and biased in its approach to accounting for what people value as contributing to their physical and material comfort/wellbeing in the places they live. We rank states with an alternative approach to assessing the quality-of-life for individuals in particular locations. Our estimates of a state’s quality-of-life is based on the hypothesis that a significant amount of what individuals value in the places they live is unobservable, but is reflected in the difference between their amenity-adjusted housing cost (what they actually pay to live in a particular place) and their amenity-adjusted incomes.

To illustrate the logic of this contention, consider a situation where profit maximizing firms and utility maximizing workers have a choice between two locations. One location is pleasant and the other is harsh. A combined wage and rent differential will materialize between the two locations as the labor and housing markets equilibrate. In the final analysis, the pleasant location will offer a combination of wages and rents, the price, with which the amenities are purchased. The harsh location will offer a combination of

wages and rents, a lower price, which compensates for the lack of amenities. The pleasant location might offer lower wages and higher rents. Conceivably, if this combination of wages and rents exist, all else held constant, most workers chose to locate in the pleasant location. Thus, the increased competition for jobs and land, in the pleasant location, would push downward pressure on wages and upward pressure on rents. It is not necessary that wages be lower and rents be higher, but it is necessary that the combination be a net payment (Granger and Blomquist, 1999). We implement a ranking scheme consistent with this notion, and find that states like Mississippi, with a larger than average Black population, that typically ranks as one of the worst places to live, are instead among the best.

### **Amenities and Spatial Equilibrium**

MQ-type quality-of-life rankings typically rank Gulf States (such as Mississippi) at or near the bottom of the list. The status of Mississippi as being one of the least desirable states to live appears to be persistent in Morgan Quitno Press annual rankings. For each year between 1991 and 2012, the highest ranking realized by Mississippi was in 1991, when it ranked 45<sup>th</sup> among all states. Table 1 reproduces a recent 2008 MQ ranking of the states. The ranking of each state is based upon its weighted score based on 44 factors presumed to be important for an individual's quality-of-life. These factors include for example the percent change in the number of crimes, highway fatality rates, and the percent of the eligible population that votes. In 2008, Mississippi had the distinction of having the lowest ranking. If one takes the MQ rankings seriously, and view them as representing some hierarchical ranking of the states in terms of amenities, New Hampshire would be considered most pleasant, and Mississippi would be most harsh. The fact that we observe people living in Mississippi raises the question, at least metaphorically, why would one voluntarily choose to live in a "most harsh" environment. Moreover, why would people migrate into the state, particularly Black Americans—who comprise a larger than average percentage of the population.

The methodology underlying the MQ rankings does not provide an answer to this question, as it merely accounts for an arbitrarily determined set of factors presumed to account for what constitutes a "pleasant or harsh" place to live. For example, one of the components of the MQ rankings is the percent of the population that votes. As this measure increases, a state's rank increases. Here, presumably individuals value high voter participation; this seems plausible, but it is conceivable that some individuals may devalue it due to a lack of interest in politics and/or political participation.

To the extent that there is no accounting for tastes, accounting for all relevant amenities is an impossible exercise, and rankings of places where individuals live based on explicit amenity accounting methods are likely to result in biased rankings. The MQ rankings could therefore have a bias that slants its ranking toward one state or another simply because it introduced or omitted some observed or unobserved amenity valued by individuals. Capturing the value of both observed and unobserved amenities is possible if we view residential location decisions as representative of a spatial equilibrium as in Roback (1982)<sup>1</sup>.

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<sup>1</sup> More formally, Roback (1982) assumes a world of identical individuals and firms across locations, with indirect individual utility given by  $V(r,p,s)$ . The cost functions of firms producing housing and commodities under constant returns to scale are  $G(w,r,s)$  and

A spatial equilibrium is a solution to a location problem wherein individuals and firms make optimal choices about the consumption and production of commodities, housing, and amenities. The solution to this problem generates a location specific equilibrium revealing that the value economic agents place on the amenities—which is the difference between the amenity-adjusted housing prices and the amenity-adjusted wages. Thus, whatever amenities an individual values the residual when amenity adjusted housing prices are regressed on amenity-adjusted wages provides an unbiased estimate of the value individuals place on living in a given location.

Given unobserved preferences for amenities, a spatial equilibrium approach to valuing the quality-of-life of a location seems more compelling than an explicit amenity accounting approach that generated the hierarchical ranking of desirable locations as in the MQ rankings in Table 1. Accepting the MQ ranking approach requires one to concede that Mississippi compared to New Hampshire provides a *prima facie* delineation between a “pleasant vs. harsh” location—regardless of what optimizing individuals prefer in a spatial equilibrium context.

### Ranking Quality-of-Life from a Spatial Equilibrium Perspective

Empirically, Glaeser, Kolko, and Saiz (2001) have considered a spatial equilibrium approach to measuring amenities. They did not rank locations by quality-of-life; however, they did find a positive correlation to exist between population growth and the residual of an Ordinary Least Squares (OLS) regression of median housing prices on median incomes. To the extent that this residual measures local amenities, their finding supports the contention that amenity-maximizing individuals would migrate toward locations with high levels of amenities. Winter (2010) recently considered a variation of this approach. Here too, the results seem to be consistent with location decisions being influenced by local amenities. Building on this work, we estimate an OLS residual that comprises our approximated spatial equilibrium “amenity index.”

As an econometric specification, an OLS model provides parameter estimates of the effect of amenity-adjusted incomes regressed on amenity-adjusted housing prices in a given state across its counties.<sup>2</sup> The equilibrium relationship is amenity-adjusted housing =

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$C(w, r, s)$  respectively, where  $p$  is the cost of housing ( $h$ ),  $r$  is the rental cost of land,  $w$  is the wage rate, and  $s$  the quantity of some location-specific amenity. In a spatial equilibrium, for individual consumers, wages and rents equalize utility and for firms, unit production costs equal the cost of producing land and housing. Let  $V_s$  be the partial derivative of indirect utility with respect to a change in location-specific amenity  $s$  ( $V_s > 0$ ), and  $V_w$  be the partial derivative of indirect utility with respect to a change in the wage ( $V_w > 0$ ). In equilibrium, the demand for amenities or how individuals value location-specific amenities is  $p_s^*$ , which via Roy's identity is:

$$p_s^* \equiv V_s/V_w = h(dp/ds) - dw/ds$$

where  $h(dp/ds)$  is the housing premium induced by the location-specific amenities, and  $dw/ds$  is the wage premium induced by the location-specific amenities. Thus, in a spatial equilibrium, the value of all amenities for an individual in a given location is the difference between amenity-adjusted housing prices and amenity-adjusted wages/incomes.

<sup>2</sup> The residual from a misspecified amenity-adjusted housing price model is a result from elementary econometrics. Suppose we specify:

amenity-adjusted incomes + demand for (i.e., value of) amenities. This follows from Roback (1982). An OLS parameter estimate of this specification that omits amenities generates an error term that contains the value of local amenities. It approximately captures the value of the amenity-bundle in a given location, which is presumably the difference between the amenity-adjusted cost of housing and amenity-adjusted income/wages (ibid).

We implement this spatial equilibrium approach to estimate the value of amenities with census data on county-level median housing prices and incomes in 2000. Our data consist of county level median house prices and county level median household incomes from the 2000 U.S Census. The residuals from an OLS regression of the log of county median housing prices on the log of county median income generate our measure of the value of amenities in a given state. The log-linear specification seemed appropriate after examining the residuals from our regression models. We use this measure to construct our quality-of-life ranking for states in the USA. For each state, we then proceed to measure its amenities by capturing the mean and median value of the residual error term obtained by regressions across each county in a given state. The state's rank is determined by these two measures of central tendency. To benchmark our results, we compare our ranking with the MQ 2000 state rankings in Table 2.

Table 3 reports the ranking of the states based on a state's mean measure of amenities. Based on our measure of amenities, Hawaii achieved the highest rank, in contrast to its MQ rank of being in the bottom half of all states. For Mississippi, the contrast with its standing in the MQ rankings is less dramatic than in the case of Hawaii, but its ranking improves substantially to the 29<sup>th</sup> position. In general, while Texas falls in position relative to its MQ rank, the Gulf States (Alabama, Florida, Mississippi, and Texas) improve their average rank in Table 3. If for a given state, the amenity distribution across counties is skewed, the rankings in Table 3 could be biased. In Table 4, we control for this possibility by ranking states based on median county amenities. Allowing for skewness across counties does not appear to substantially matter, as the rankings in Table 4 are approximately similar at the top and bottom of the state rankings.

What explains the dramatic differences between the MQ rankings and the results from our spatial equilibrium approach? Our approach recognizes that in a spatial

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$$\text{housing price}^* = \beta_o + \beta_1 \text{income}^* + u \quad (1)$$

where an asterisk denotes the variable is adjusted for amenities in a given location and  $u$  is a random error term. Let the true model be:

$$\text{housing price}^* = \beta_o + \beta_1 \text{income}^* + \beta_2 \text{location amenity} + v \quad (2)$$

where  $v$  is a random error term. The residual error from the OLS parameter estimates of (1) is:

$$u = \beta_2 \text{location amenity} + v$$

If we assume that the expected value of  $v$  is zero ( $E[v] = 0$ ), then the residual error from OLS parameter estimates of the misspecified model in (1) is an unbiased estimate of unobserved location-specific amenities.

equilibrium, the quality-of-life in a location is determined by the difference between the amenity-adjusted housing premium and the amenity-adjusted wage/income premium. If many of the amenities that individuals value in a location are unproductive in the sense that they are costly for firms to produce (Roback, 1982), then in equilibrium, wage/incomes vary inversely with amenities. Our results are perhaps reflecting this, as southern states, which have low wages/incomes relative to northern states, move up in ranking significantly in our rankings. In general, our ranking approach suggests that one reason why wages/incomes are relatively lower in southern states is that amenities are relatively higher. This also suggests that the MQ rankings, based on an approach that attempts to explicitly identify relevant amenities, omit a large portion of unproductive amenities that people value resulting in downwardly biased measure of a state's quality-of-life. We suspect that unlike the explicit amenity accounting approaches that informs the MQ rankings, our spatial equilibrium approach captures all relevant and unobservable location-specific amenities as capitalized in housing prices and wages/incomes—and wages/incomes adjust downward for those amenities that are unproductive for profit-maximizing firms but valued by individuals.

Similar to the approach of the MQ rankings, our rankings in Table 3 and 4 ignores heterogeneity in the valuation and demand/supply of amenities across the 50 states. Of course, this need not be the case, for example; the rate to which individuals are willing to exchange a unit reduction in wages for a unit improvement of clean air—conditional on all other amenities—may be a function of wealth and/or income. If this were the case, the demand for an unproductive amenity like clean air would be income and wealth elastic and its valuation and demand would be higher in wealthier and/or high-income states. If this is the case, our rankings in Tables 3 and 4 may be biased. We address this possibility by generating the value of amenities in a state from residuals of quartile regression parameter estimates of the log of median county housing prices on median county household income. Quantile regression (Buchinsky, 1998; Koenker and Hallock, 2001; Mello and Perrelli, 2003) allows one to condition parameter estimates on the position a dependent variable occupies in a distribution (e.g. percentiles). This allows for differences in how the dependent variable is conditioned by the independent variable—parameter heterogeneity. In the case of amenities across the 50 states, a quartile regression will permit a determination as to how, wealth/income matters—as captured through the distribution of housing prices across the states—for the valuation of amenities.

Table 5 reports our ranking when the amenity values are generated by the residuals from quantile regression parameter estimates. Our implementation of the quantile regressions proceeded first by identifying the percentile distribution of housing prices across the 50 states. We identified 9 percentiles, and then proceeded to estimate quantile regressions for the 1st, 5th, 10th, 25th, 50th, 75th, 90th, 95th and 99<sup>th</sup> percentiles. The regression for each percentile resulted in significant parameters in every instance. The residual amenity index was then computed by using the parameter estimates corresponding to the median housing price percentile each county in a state occupied. The state of West Virginia emerged as the most desirable state, and Mississippi now ranks 5<sup>nd</sup> among all states in terms of quality-of-life, and the average rank of the Gulf States increased substantially.

The rank of New Hampshire, the top-ranked state in the MQ rankings, is now 35<sup>th</sup>, with Rhode Island having the status as the least desirable state. The effects of possible heterogeneity in the valuation of amenities are quite dramatic at the top and bottom of the ranking distribution. Of the top ten ranked states in Table 4, only four remain in Table 5 (Arizona, Hawaii, Oregon, and Louisiana). Of the bottom ranked states in Tables 4, only three remain in Table 5 (Kansas, North Dakota, and South Dakota). The possible

importance of heterogeneity in the valuation and demand for amenities by individuals is illustrated by the dramatic change in rank of the three Gulf States of Alabama, Louisiana, and Mississippi, along with West Virginia. All four of these states move up substantially relative to their rank in Table 4.

Relative to MQ-type rankings, our ranking scheme provides different orderings for states in terms of their quality-of-life, and hence desirability. Ultimately such rankings can only be convincing if they also capture the relative attractiveness of a location in terms of optimizing agents—firms or individuals—making migration decisions, and bringing with them their physical and human capital endowments on the basis of relative attractiveness. Douglas (1997) for example, provides an alternative place-ranking measure that is based on all pair-wise migration between all states, with the quality-of-life rank of a state being the increasing function of its ability to attract population from other states. Such a measure captures the idea that migration from one location to another by individuals is response to differential living standards. Thus, quality-of-life measures should indeed reflect living standards and/or amenities that influence individuals' migration decisions.

To explore the explanatory power of our state level quality-of-life ranking process relative to that of MQ, we consider to which extent a state's 1995–2000 net migration rank reported in Table 6 is explained by its quality-of-life-rank reported in Tables 2 through 5. The results, based on an Ordinary Least Squares regression specification and Spearman's rank correlation coefficient are reported in Table 7. Column 1 reports the results for the MQ state ranks. Both the OLS parameter estimates and Spearman's rank correlation coefficient reveal a very small positive, but statistically insignificant relationship between a state's net migration rank and MQ quality-of-life rank. This suggests that MQ-type measures of quality-of-life are not consistent with optimal migration behavior, and as such are poor measures of a state's quality-of-life. For our spatial equilibrium quality-of-life measures, the results reported in columns 2 through 4 reveal a positive and statistically significant relationship between a state's net migration rank and quality-of-life rank. This suggests that our spatial equilibrium quality-of-life measures are consistent with optimal migration behavior, and support our hypothesis governing how individuals value the places they live.

That the correlations on our spatial equilibrium quality-of-life measures are significant, positive, and larger in magnitude relative to the MQ measure suggest that our approach to ranking quality-of-life is more compelling theoretically. Additionally, they are consistent with the findings of Jordan (2009) on the role of amenities as a population attractor. The positive and significant correlations between a state's net migration and quality-of-life rank are consistent with optimizing individuals migrating based on quality-of-life differentials. These outcomes are consistent with the notion that individuals are making location choices based on preferences for desirable public and private amenities (Tiebout, 1956). Presumably, migration represents "voting with one's feet" in response to quality-of-life differentials across locations (Douglas and Wall, 1993; Douglas, 1997). Thus, in a spatial equilibrium, quality-of-life and net migration should be proportional—which holds for each of our state quality-of-life measures.

The largest regression coefficient and Spearman's rank correlation coefficient is for our amenity measure that accounts for heterogeneity in the valuation and demand/supply of amenities across states. The  $R^2$  for the specification in column 4 is the largest suggesting that relative to the specification in columns 1 through 3 (which assume amenities are valued equally across the states) have better explanatory power. This suggests that the assignment of equal weights in quality-of-life measures is inappropriate, and leads to biases in ranking



quality-of-life across geographic locations. The dramatic changes in state quality-of-life ranks reported in Table 5 suggest that these biases are substantial. For example, West Virginia moves to the top rated spot when accounting for heterogeneity in the valuation and demand/supply of amenities. This is in contrast to its MQ rank of 49, and a rank of 15 in our spatial measures that do not account for amenity heterogeneity. To explore the explanatory power of our state level quality-of-life ranking process relative to that of MQ, we consider the extent to which a state's 1995-2000 net migration rank (reported in Table 6) is explained by its quality-of-life rank (reported in Tables 2 through 7).

## **Conclusions and Policy Implications**

This paper introduced an alternative quality-of-life measure compared to those based on explicit amenity accounting methods. We find that our approach overcomes biases inherent to MQ type rankings and is theoretically coherent. It was not necessary to construct weights for amenities or to assume individuals valued amenities identically. Our measures based on amenity adjusted housing prices and incomes in a spatial equilibrium, ranked states accordingly. For the year 2000, we found that in contrast to the MQ quality-of-life rankings, Gulf States were generally among the highest in the rankings. The MQ rankings typically find states with larger than average Black populations, such as Mississippi or in general, Gulf States to be among the lowest ranked in the United States. We find that if one takes seriously the economic theory of why people choose to live in a particular location, Gulf states with a larger than average Black population are among the best places to live. Consistent with Forgerd (2011) our rankings of the states, base quality-of-life on how individuals value all amenities that are important to their wellbeing, most of which are unobserved, and are not considered in the explicit amenity accounting approach that motivates MQ-type quality-of-life rankings.

To the extent that regional planners and public policymakers prioritize and make the case for public investments in education, infrastructure, and other public goods on the basis of a region's amenities, our results suggest that locales which have larger than average Black population may warrant more public investment in the future. Given the Black populations reverse migration south (Frey, 2004); and there appears to be no correlation between a state's quality-of-life ranking and employment growth (Hsing and Budden, 2010, Rappaport 2009), any shortfalls in public investment that contributed to the high quality-of-life could lead to a decrease in their wellbeing (Gabriel, Matthey and Wascher, 2003). This of course is contingent upon the extent to which public investments quality-of-life are complementary over time.

Our results provide elected officials, researchers, and public policy analysts with an unbiased theoretically coherent tool appropriate for evaluating the effectiveness of various policy initiatives. Our methodology for ranking states based on its quality-of-life/amenities can be useful in evaluating the efficacy of publicly funded projects aimed at promoting economic growth and improving the human condition. Cross-state regressions of amenity residuals, conditioned on pre and post existence of suitable proxies for public projects can produce additional insights when evaluated using our approach. Conceivably, projects aimed at pollution abatement, education reform, improving public health, infrastructure improvement, workforce development, etc., could be objectively evaluated in a theoretically sound manner. If for example, the creation of an enterprise zone is found to have a positive and significant effect on a political jurisdiction's amenity residuals, then that would suggest that the project improved the jurisdiction's quality-of-life.

**Table 1. MQ 2008 Quality of Life State Rankings**  
*(Explicit Amenity Accounting Method)*

| State         | Rank | State                 | Rank |
|---------------|------|-----------------------|------|
| New Hampshire | 1    | Illinois              | 26   |
| Utah          | 2    | Delaware              | 27   |
| Wyoming       | 3    | Florida               | 28   |
| Minnesota     | 4    | Alaska                | 29   |
| Iowa          | 5    | California            | 30   |
| Nebraska      | 6    | Indiana               | 31   |
| New Jersey    | 7    | Oklahoma              | 32   |
| Vermont       | 8    | New Mexico            | 33   |
| Idaho         | 9    | Pennsylvania          | 34   |
| North Dakota  | 10   | Nevada                | 35   |
| Connecticut   | 11   | Arizona               | 36   |
| Virginia      | 12   | Texas                 | 37   |
| Massachusetts | 13   | Michigan              | 38   |
| Colorado      | 14   | Missouri              | 39   |
| South Dakota  | 15   | Georgia               | 40   |
| Maryland      | 16   | Ohio                  | 41   |
| Kansas        | 17   | North Carolina        | 42   |
| Washington    | 18   | West Virginia         | 43   |
| Montana       | 19   | Alabama               | 44   |
| Maine         | 20   | Louisiana             | 45   |
| Hawaii        | 21   | Arkansas              | 46   |
| Oregon        | 22   | Tennessee             | 47   |
| Wisconsin     | 23   | Kentucky              | 48   |
| New York      | 24   | <i>South Carolina</i> | 49   |
| Rhode Island  | 25   | Mississippi           | 50   |

*Source:* State Rankings 2008, Morgan Quitno Press, Lawrence, KS.

**Table 2. MQ 2000 Quality of Life State Rankings**  
*(Explicit Amenity Accounting Method)*

| <b>State</b>  | <b>Rank</b> | <b>State</b>   | <b>Rank</b> |
|---------------|-------------|----------------|-------------|
| Minnesota     | 1           | Nevada         | 26          |
| Iowa          | 2           | Texas          | 27          |
| Colorado      | 3           | Michigan       | 28          |
| Utah          | 4           | Illinois       | 29          |
| New Hampshire | 5           | Georgia        | 30          |
| Kansas        | 6           | Rhode Island   | 31          |
| Wisconsin     | 7           | Kentucky       | 32          |
| Virginia      | 8           | Montana        | 33          |
| Nebraska      | 9           | Pennsylvania   | 34          |
| Massachusetts | 10          | North Carolina | 35          |
| South Dakota  | 11          | California     | 36          |
| Vermont       | 12          | Oklahoma       | 37          |
| Connecticut   | 13          | New York       | 38          |
| North Dakota  | 14          | Arizona        | 39          |
| Maine         | 15          | Florida        | 40          |
| New Jersey    | 16          | Alaska         | 41          |
| Delaware      | 17          | Alabama        | 42          |
| Maryland      | 18          | Hawaii         | 43          |
| Indiana       | 19          | South Carolina | 44          |
| Wyoming       | 20          | Arkansas       | 45          |
| Oregon        | 21          | Tennessee      | 46          |
| Washington    | 22          | New Mexico     | 47          |
| Missouri      | 23          | Louisiana      | 48          |
| Idaho         | 24          | West Virginia  | 49          |
| Ohio          | 25          | Mississippi    | 50          |

*Source:* State Rankings 2006, Morgan Quitno Press, Lawrence, KS.

**Table 3. MQ 2000 Quality of Life State Rankings**  
*(Spatial Equilibrium Method: Mean County Amenities)*

| State          | Rank | State         | Rank |
|----------------|------|---------------|------|
| Hawaii         | 1    | Connecticut   | 26   |
| California     | 2    | New Jersey    | 27   |
| Massachusetts  | 3    | Nevada        | 28   |
| Washington     | 4    | Mississippi   | 29   |
| Colorado       | 5    | Maryland      | 30   |
| Oregon         | 6    | Georgia       | 31   |
| Arizona        | 7    | New York      | 32   |
| New Mexico     | 8    | New Hampshire | 33   |
| Idaho          | 9    | Pennsylvania  | 34   |
| Utah           | 10   | Michigan      | 35   |
| North Carolina | 11   | Ohio          | 36   |
| Rhode Island   | 12   | Arkansas      | 37   |
| Maine          | 13   | Wisconsin     | 38   |
| Alabama        | 14   | Alaska        | 39   |
| West Virginia  | 15   | Missouri      | 40   |
| Florida        | 16   | Indiana       | 41   |
| Delaware       | 17   | Minnesota     | 42   |
| Wyoming        | 18   | Oklahoma      | 43   |
| Tennessee      | 19   | Illinois      | 44   |
| Virginia       | 20   | Iowa          | 45   |
| Vermont        | 21   | Texas         | 46   |
| Montana        | 22   | Nebraska      | 47   |
| Kentucky       | 23   | South Dakota  | 48   |
| South Carolina | 24   | Kansas        | 49   |
| Louisiana      | 25   | North Dakota  | 50   |

*Source:* State Rankings 2006, Morgan Quitno Press, Lawrence, KS.

Notes: Rankings are based on the equilibrium value of amenities as measured by the size of the residuals from an Ordinary Least Squares (OLS) Regression of the log of median home prices on the log of median income. Data are from the 2000 U.S. Census. The estimated regression model is:

$$\log(\text{median housing price}) = -3.51 + 1.412 \log(\text{median income})$$

$$N = 3138, \quad R^2 = .58 \quad (.222) \quad (.021)$$

where N is the number of observations, and R<sup>2</sup> is the coefficient of determination. The standard errors are in parentheses, and indicate statistical significance for each parameter.

**Table 4. MQ 2000 Quality of Life State Rankings**  
*(Spatial Equilibrium Method: Median County Amenities)*

| State          | Rank | State         | Rank |
|----------------|------|---------------|------|
| Hawaii         | 1    | Wyoming       | 26   |
| California     | 2    | Connecticut   | 27   |
| Washington     | 3    | Georgia       | 28   |
| Oregon         | 4    | Mississippi   | 29   |
| Massachusetts  | 5    | Maryland      | 30   |
| Colorado       | 6    | New Hampshire | 31   |
| Arizona        | 7    | Pennsylvania  | 32   |
| Rhode Island   | 8    | New Jersey    | 33   |
| Utah           | 9    | Ohio          | 34   |
| New Mexico     | 10   | Alaska        | 35   |
| Idaho          | 11   | Michigan      | 36   |
| North Carolina | 12   | Arkansas      | 37   |
| Delaware       | 13   | Wisconsin     | 38   |
| Nevada         | 14   | New York      | 39   |
| West Virginia  | 15   | Missouri      | 40   |
| Maine          | 16   | Indiana       | 41   |
| Vermont        | 17   | Minnesota     | 42   |
| Montana        | 18   | Oklahoma      | 43   |
| Florida        | 19   | Iowa          | 44   |
| Tennessee      | 20   | Illinois      | 45   |
| Louisiana      | 21   | Texas         | 46   |
| Alabama        | 22   | Nebraska      | 47   |
| Virginia       | 23   | South Dakota  | 48   |
| Kentucky       | 24   | Kansas        | 49   |
| South Carolina | 25   | North Dakota  | 50   |

Notes: Rankings are based on the equilibrium value of amenities as measured by the size of the residuals from an Ordinary Least Squares (OLS) Regression of the log of median home prices on the log of median income. Data are from the 2000 U.S. Census. The estimated regression model is:

$$\log(\text{median housing price}) = -3.51 + 1.412 \log(\text{median income})$$

$$N = 3138, \quad R^2 = .585 \quad (.222) \quad (.021)$$

where N is the number of observations, and R<sup>2</sup> is the coefficient of determination. The standard errors are in parentheses, and indicate statistical significance for each parameter.

**Table 5. MQ 2008 Quality of Life State Rankings**  
*(Spatial Equilibrium Method with Amenity Heterogeneity)*

| State          | Rank | State         | Rank |
|----------------|------|---------------|------|
| West Virginia  | 1    | Pennsylvania  | 26   |
| Alabama        | 2    | Virginia      | 27   |
| New Mexico     | 3    | Delaware      | 28   |
| Arizona        | 4    | Massachusetts | 29   |
| Mississippi    | 5    | Michigan      | 30   |
| Montana        | 6    | New York      | 31   |
| Oregon         | 7    | Oklahoma      | 32   |
| Louisiana      | 8    | Ohio          | 33   |
| Hawaii         | 9    | Wisconsin     | 34   |
| Tennessee      | 10   | New Hampshire | 35   |
| Colorado       | 11   | Nevada        | 36   |
| Kentucky       | 12   | Indiana       | 37   |
| Idaho          | 13   | Texas         | 38   |
| South Carolina | 14   | Minnesota     | 39   |
| Washington     | 15   | Iowa          | 40   |
| North Carolina | 16   | Nebraska      | 41   |
| California     | 17   | Illinois      | 42   |
| Maine          | 18   | South Dakota  | 43   |
| Florida        | 19   | Maryland      | 44   |
| Georgia        | 20   | Kansas        | 45   |
| Arkansas       | 21   | North Dakota  | 46   |
| Utah           | 22   | Alaska        | 47   |
| Missouri       | 23   | New Jersey    | 48   |
| Wyoming        | 24   | Connecticut   | 49   |
| Vermont        | 25   | Rhode Island  | 50   |

Notes: Rankings are based on the equilibrium value of amenities as measured by the size of the residual generated by the parameter estimates of a quartile regression specification of the log of county median home prices on the log of county median household income. Data are from the 2000 U.S. Census. The quartile regression parameter estimates, with standard errors in parentheses for the 9 relevant quartiles ( $\tau$ ) are:

$$\tau = .01: \log(\text{median housing price}) = -8.95 + 1.872 \log(\text{median income})$$

$$N = 3138, \text{ Pseudo-}R^2 = .3241 \quad (3.98) \quad (.382)$$

$$\tau = .05: \log(\text{median housing price}) = -7.98 + 1.79 \log(\text{median income})$$

$$N = 3138, \text{ Pseudo-}R^2 = .3566 \quad (.559) \quad (.053)$$

$$\tau = .10: \log(\text{median housing price}) = -7.05 + 1.72 \log(\text{median income})$$

$$N = 3138, \text{ Pseudo-}R^2 = .3512 \quad (.386) \quad (.037)$$

$$\tau = .25: \log(\text{median housing price}) = -4.45 + 1.48 \log(\text{median income})$$

$$N = 3138, \text{ Pseudo-}R^2 = .3512 \quad (.268) \quad (.026)$$

$$\tau = .50: \log(\text{median housing price}) = -1.97 + 1.27 \log(\text{median income})$$

$$N = 3138, \text{ Pseudo-}R^2 = .3512 \quad (.233) \quad (.022)$$

$$\tau = .75: \log(\text{median housing price}) = -1.21 + 1.20 \log(\text{median income})$$

$N = 3138$ , Pseudo- $R^2 = .3857$  (.258) (.025)  
 $\tau = .90$ :  $\log(\text{median housing price}) = -2.53 + 1.35 \log(\text{median income})$   
 $N = 3138$ , Pseudo- $R^2 = .3793$  (.258) (.025)  
 $\tau = .95$ :  $\log(\text{median housing price}) = -3.86 + 1.49 \log(\text{median income})$   
 $N = 3138$ , Pseudo- $R^2 = .3738$

**Table 6. State Rankings: Net Migration 1995 – 2000**

| State          | Rank      | State         | Rank       |
|----------------|-----------|---------------|------------|
| Nevada         | 1 (151.5) | Rhode Island  | 26 (3.4)   |
| Arizona        | 2 (74.3)  | Maine         | 27 (3.1)   |
| Georgia        | 3 (48.6)  | Wisconsin     | 28 (1.5)   |
| North Carolina | 4 (48.4)  | Kansas        | 29 (-3.1)  |
| Florida        | 5 (44)    | Maryland      | 30 (-4.1)  |
| Colorado       | 6 (43.9)  | Montana       | 31 (-6.1)  |
| South Carolina | 7 (37.2)  | West Virginia | 32 (-6.3)  |
| Idaho          | 8 (29.7)  | Massachusetts | 33 (-9.4)  |
| Tennessee      | 9 (28.7)  | Nebraska      | 34 (-9.7)  |
| New Hampshire  | 10 (25)   | Michigan      | 35 (-10.0) |
| Delaware       | 11 (24.9) | Ohio          | 36 (-11.0) |
| Oregon         | 12 (24.5) | Pennsylvania  | 37 (-11.4) |
| Arkansas       | 13 (17.4) | Iowa          | 38 (-12.1) |
| Washington     | 14 (14.4) | South Dakota  | 39 (-17.6) |
| Utah           | 15 (13)   | New Mexico    | 40 (-17.8) |
| Virginia       | 16 (12)   | Louisiana     | 41 (-18.1) |
| Mississippi    | 17 (10.4) | Connecticut   | 42 (-20.6) |
| Kentucky       | 18 (9.2)  | New Jersey    | 43 (-23.6) |
| Missouri       | 19 (9.0)  | California    | 44 (-24.6) |
| Texas          | 20 (8.1)  | Wyoming       | 45 (-26.7) |
| Minnesota      | 21 (6.5)  | Illinois      | 46 (-29.7) |
| Alabama        | 22 (6.3)  | North Dakota  | 47 (-40.6) |
| Oklahoma       | 23 (5.4)  | New York      | 48 (-48.8) |
| Vermont        | 24 (4.0)  | Alaska        | 49 (-51.0) |
| Indiana        | 25 (3.9)  | Hawaii        | 50 (-65.4) |

Notes: Net migration rate, defined as the difference between the In-migration and Out-migration rate, is reported in parentheses. Source: State-to-State Migration Flows: 1995 – 2000, Census 2000 Special Report, August 2003, US Census Bureau.

**Table 7. The Effect of Quality-of-Life Rank on Net Migration Rank**

| Specification:  | (1)                          | (2)                          | (3)                          | (4)                          |
|---|------------------------------|------------------------------|------------------------------|------------------------------|
| <b>Regressand:</b> Net Migration Rate Rank<br>(Table 6) |                              |                              |                              |                              |
| <b>Regressors:</b>                                      |                              |                              |                              |                              |
| M-Q Rank: (Table 2)                                     | .002<br>(.144)               |                              |                              |                              |
| State Spatial Amenity Rank (Table 3):                   |                              | .261<br>(139) <sup>b</sup>   |                              |                              |
| State Spatial Amenity Rank (Table 4)                    |                              |                              | .317<br>(.137) <sup>a</sup>  |                              |
| State Spatial Amenity Rank (Table 5):                   |                              |                              |                              | .363<br>(.134) <sup>a</sup>  |
| Constant  | 25.45<br>(4.23) <sup>a</sup> | 18.85<br>(4.08) <sup>a</sup> | 17.39<br>(4.01) <sup>a</sup> | 16.24<br>(3.94) <sup>a</sup> |
| <i>Number of Observations:</i>                          | 50                           | 50                           | 50                           | 50                           |
| $R^2$   | .00001                       | .067                         | .101                         | .132                         |
| $\rho_s$  | .002                         | .261 <sup>b</sup>            | .317 <sup>b</sup>            | .363 <sup>a</sup>            |

Notes: a is Significant at the .01 level; b is Significant at the .05 level;  $\rho_s$  is Spearman's rank correlation coefficient. Significance is determined based on the standardized normal test statistic  $z = \rho_s \times (n - 1)^{.50}$  (Tamhane and Dunlop, 2000).

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